



TOWN OF WESTERLY

# REQUEST FOR PROPOSAL

2017-017

## DESIGN/BUILD ROOFTOP SOLAR SYSTEM HIGHWAY GARAGE

APRIL 2017

**TOWN OF WESTERLY  
INVITATION TO BID  
2017-017  
DESIGN/BUILD ROOFTOP SOLAR  
SYSTEM  
HIGHWAY GARAGE  
INFORMATION FOR VENDORS**

Sealed proposals for the **DESIGN/BUILD ROOFTOP SOLAR SYSTEM FOR THE HIGHWAY GARAGE** will be received until **3:00 P.M. on April 27, 2017**, Westerly Town Hall, Council Chambers, 45 Broad St., Westerly, RI 02891. Bids will be publicly opened and the names of the offerors will be read aloud. Any bids received after time and date specified will not be considered. Copies of the Bid Documents may be obtained on or after **April 6, 2017** either on-line through the website [www.westerly.govoffice.com](http://www.westerly.govoffice.com) or by calling the Department of Public Works at 401-348-2587 between the hours of 8:30 a.m. and 4:30 p.m., Monday through Friday. A **Mandatory Pre-Bid meeting** will be held at **1:30 PM on April 13, 2017** at the Westerly Highway Garage, 35 Larry Hirsch Lane, Westerly, RI. All questions must be received by **April 21, 2017 at 12:00 p.m.** and must be directed to Mark Miller at [mark.miller@colliers.com](mailto:mark.miller@colliers.com)

Bid Security in the amount of five (5) percent of the total Bid amount from the Rate Sheet, must accompany each bid. The successful Bidder must furnish a Performance Bond and a Labor and Material Payment Bond, in the specific formats as attached herein, both for the full value of the Bid Price, along with all required insurance certificates, within fifteen (15) calendar days after the award date; the Town of Westerly reserves the right to waive this bond requirement.

In addition, prospective bidders shall also submit with their hardcopy bid(s), one (1) read-only CD-R media disc as the "Public Copy". The Public Copy disc must be separately enclosed in a protective cover clearly marked "Public Copy" and include the following information: (1) Title of Solicitation; (2) Name of Bidder and Address; and (3) Date of Bid. The Public Copy shall include the following items:

I. Scanned copy of the original executed Bid Form submitted and Contract Bid Documents; and Scanned Copy of original Bid Bond for the project. **Bid proposals that do not include a copy for public inspection will be deemed nonresponsive and rejected.**

ALL trades are required to pay prevailing wages. (Davis Bacon Act RI140001 - As amended up to the date of this Bid). Individuals requesting interpreter services for the hearing impaired and other individuals requiring special accommodations should call 401-348-2500 or 401-596-2022 (v/tdd) seventy-two (72) hours in advance of the opening of the bids.

No Bidder may withdraw his or her Bid within ninety (90) days following the closing time for receipt of Bids. Responses will be evaluated on the basis of the relative merits of the bid in addition to the price. The Town of Westerly does not discriminate on the basis of age, race, religion, national origin, color, or disability in accordance with applicable laws and regulations. The Town of Westerly reserves the right to reject any and all Bids or parts thereof, to waive any irregularity in the Bids received, and to accept the Bid or parts thereof deemed to be most favorable to the best interest of the Town.

The Town of Westerly reserves the right at any time to modify, waive, or otherwise vary the terms and conditions of this Bid including, but not limited to, the deadlines for submission, the submission requirements and the Scope of Work. The Town further reserves the right to reject any or all submittals, to cancel or withdraw this Bid at any time. The Proposer, who is otherwise competent, and submits the lowest responsive and responsible Response, shall, subject to the conditions, limitations and restrictions previously set forth herein, be awarded the Bid, subject to the negotiation of a mutually acceptable Contract with the Town.

## GENERAL CONDITIONS AND INSTRUCTIONS

**ACCEPTANCE OR REJECTION OF BIDS** the Town of Westerly reserves the right to waive irregularities or technicalities in bids or to reject all bids or any part of any bid.

**ADDITIONAL INFORMATION** Each bidder shall examine all parts of the Invitation to Bid documents and shall judge all matters relating to the adequacy and accuracy of such documents. The Town of Westerly shall not be responsible for oral interpretations given by any Town employee, representative, or others. No plea of ignorance, by the bidder, of conditions that exist or that may hereafter exist as a result of failure or omission on the part of the bidder to make the necessary examinations and investigations, or failure to fulfill in every detail the requirements of the contract documents, will be accepted as a basis for varying the requirements of the Town of Westerly or the compensation to the bidder. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to these specifications should be submitted to: Mark Miller at [mark.miller@colliers.com](mailto:mark.miller@colliers.com) no later than **12:00 p.m. on April 21, 2017**.

The bid title and number should be referenced on all correspondence. Should any questions or responses require revisions to the specifications as originally published, such revisions will be by formal amendment only.

The issuance of a written addendum is the only official method whereby interpretation, clarification or addition information will be given. If any amendments are issued to this Invitation to Bid, the Town will attempt to notify all prospective bidders who have secured same; however, it shall be the responsibility of each bidder, prior to submitting their bid, to view the websites [www.westerly.govoffice.com](http://www.westerly.govoffice.com) or by contacting the Town of Westerly's Department of Public Works @ 401-348-2587 to determine if an amendment was issued and make such addendum a part of their bid.

**BID SUBMISSION** **Five (5) Originals and one (1) public copy on CD of this entire document as well as any other pertinent documents should be returned in order for the bid to be considered for award.** Bids shall be submitted to the Town of Westerly, 45 Broad Street, Westerly, RI 02891, properly signed in ink, and submitted in a sealed envelope on which shall be shown the name of the bidder, bid opening date, and name and bid number of the proposal.

By submitting a bid proposal, the bidder declares that he understands and agrees that this bid proposal, specifications, provisions, terms and conditions of same, shall become a valid contract between the Town of Westerly and the undersigned upon notice of award of contract in writing and/or issuance of Purchase Order by the Town of Westerly.

**ASSIGNMENT** The successful bidder(s) shall not assign, transfer, convey, sublet or otherwise dispose of this contract, or of any or all of its right, title or interest therein, or his or its power to execute such contract to any person, company or corporation without prior written consent of the Town.

**BIDDER CERTIFICATION** Submission of a signed bidder's certification (Appendix A) certifies that the bidder will accept any awards made to him as a result of said submission at the prices and terms contained therein.

**BID WITHDRAWAL** No proposal can be withdrawn after it is filed unless the bidder makes his request in writing to the Town prior to the time set for the opening of bids, or unless the Town fails to accept it within ninety (90) days after the date fixed for opening bids.

**BIDDER RESPONSIBILITY** Before submitting the proposal, each bidder shall make all investigations and examinations necessary to ascertain all conditions and requirements affecting the full performance of the contract, and to verify any representations made by the Town that the bidder will rely upon. No pleas of ignorance of such conditions and requirements resulting from failure to make such investigations and

examinations will relieve the successful bidder from his obligation to comply in every detail with all provisions and requirements of the contract documents.

**DEFAULT** Failure or refusal of a bidder to execute a contract upon award, or withdrawal of a bid before such award is made, may result in forfeiture of that portion of any bid surety required equal to liquidated damages incurred by the Town. Where surety is not required, failure to execute a contract as described above may be grounds for removing the bidder from the bidder's list.

**DELIVERY** All service, materials, and/or equipment are purchased F.O.B. point of delivery in Westerly. The successful bidder must prepay all transportation charges to designated point of delivery in Westerly. Collect or Freight Due shipments will be refused.

**EXCEPTIONS TO SPECIFICATIONS** Bidders taking exception to any part or section of these specifications shall indicate such exceptions on their proposal and prove to the satisfaction of the Town that said item is equal to, or better than, the product specified. Bids for alternate items shall be stated in the appropriate brand on the proposal form, or if the proposal form does not contain blanks for alternates, bidder **MUST** attach to the specification documents on Company letterhead a statement identifying, but not limited to, the manufacturer, brand name, make, model and/or Catalog Number(s) of each proposed alternate, plus a complete description of the alternate items including illustrations, performance test data and any other information necessary for an evaluation. The bidder must indicate any variances to the specification document no matter how insignificant.

The Town of Westerly reserves the right to approve as an equal, or to reject as not being an equal, any article the bidder proposes to furnish which contains major or minor variations from specification requirements but which may comply substantially therewith. Failure to indicate any exceptions shall be interpreted as the bidder's intent to fully comply with the specifications as written.

Notwithstanding the foregoing, the Town reserves the right to prohibit, in advance, any consideration of "or equal" submittals prior to the dissemination of any bid/RFP specifications.

Bidders **MUST** submit any cost-saving/value-added alternate bid pricing suggestions, such as rebates, creative lease agreements, extended warranty periods, trade-in allowances, or the availability of discounts for floor model or demonstrator units at significant savings. Any alternate pricing should be noted as a separate line that may be subtracted from the bid pricing as specified, allowing for clear evaluation and value-analysis by the Town.

**EXPENSES INCURRED IN PREPARING PROPOSAL** the Town accepts no responsibility for any expenses incurred in the proposal's preparation, and presentation; such expenses are to be borne exclusively by the bidder.

**INDEMNIFICATION** The Contractor shall indemnify and save harmless forever the Town, and all the Town's agents, officers and employees from and against all charges or claims resulting from any bodily injury, loss of life, or damage to property from any act, omission or neglect, by Bidder or its employees; the Contractor shall become defendant in every suit brought for any of such causes of action against the Town or the Town's Officials, agents and employees; the Contractor shall further indemnify Town as to all costs, attorney's fees, expenses and liabilities incurred in the defense of any such claims and any resulting investigation.

## INSURANCE

The Contractor shall assume responsibility and liability for all injuries to persons or damages to property, including property in your care, custody, and control, directly or indirectly due to, or arising out of, his operations under the contract and shall be responsible for the proper care and protection of all work performed until completion and final acceptance by the Town.

The Contractor shall also indemnify and save harmless the Town against any and all claims of whatever kind and nature due to, or arising out of, his/her breach or failure to perform any of the terms, conditions, or covenants of the contract resulting from acceptance of his/her Bid.

The Contractor shall furnish certificates of insurance from companies acceptable to the Town. All Insurance Companies listed on certificate must be licensed to do business in the State of Rhode Island. The Contractor shall provide a certificate of insurance as specified on the bidding forms. Contracts of insurance (covering all operations under this contract) shall be kept in force until the Contractor's work is accepted by the Town.

The CONTRACTOR shall provide the following insurances in accordance with the General Conditions; the Town of Westerly shall be named as additional insured and as the Certificate Holder:

- Workmen's Compensation Insurance

The CONTRACTOR shall provide adequate statutory Workmen's Compensation Insurance for all labor employed on the Project who may come within the protection of such laws and shall provide Employer's General Liability Insurance in the amount of \$500,000 for the benefit of his/her employees not protected by such compensation laws.

- Comprehensive General Liability including Premise/ Operations, Explosion, Collapse, and Underground Property Damage, Products/Completed Operations, Broad Form Contractual, Independent Contractors, Broad for Property Damage; and Personal Injury liabilities.

- Bodily Injury: \$1,000,000 Each Occurrence

\$2,000,000 Annual Aggregate

- Property Damage: \$1,000,000 Each Occurrence

\$2,000,000 Annual Aggregate

- Personal Injury: \$1,000,000 Each Occurrence

\$2,000,000 Annual Aggregate

### III. Comprehensive Automobile Liability Insurance

Comprehensive Automobile Liability including all owned (private and others), hired and non-owned vehicles: Carrier shall be A- rated or higher.

- \$1,000,000 Combined Single Limit for Bodily Injury & Property Damage

Coverage to include CA 99 48 Pollution Liability Endorsement

### IV. Excess Liability Insurance

Contractor to purchase and maintain Excess Liability insurance in the Umbrella form with Liability Limits no less than \$1,000,000. for Bodily Injury and Property Damage. Coverage to be maintained in accordance with the above requirements. Evidence of such excess liability shall be delivered to Owner in the form of a certificate indicating the policy numbers and limits of liability of all underlying insurance.

- V. If Owner has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor in accordance with this Section on the basis of its not complying with the Contract Documents, Owner will notify Contractor in writing thereof within ten days of the date of delivery of such certificates to Owner.

Contractor will provide such additional information in respect of insurance provided by him/her as Owner may reasonably request.

### VI. Insurance Covering Special Hazards

Special hazards shall be covered by rider or riders to the Public Liability Insurance and Property Damage Insurance policy or policies hereinabove required to be furnished by the CONTRACTOR, or by separate policies of insurance as follows: Property Damage Liability arising out of the collapse of, or structural injury to any building or structure due to excavation (including borrowing, filling, or backfilling in connection therewith), tunneling, pile driving, cofferdam work, or caisson work; or to moving, shoring, underpinning, razing, or demolition of any building or structure, or removal or rebuilding of any structural support thereof. Property Damage Liability for injury to or destruction of property arising directly or indirectly from blasting or explosions, however caused, other than pressure, prime movers, machinery or power-transmitting equipment.

Property Damage Liability for injury or destruction of wires, conduits, pipes, mains, sewers, or other similar property or any apparatus in connection therewith, below the surface of the ground, arising from and during the use of mechanical equipment for the purpose of excavating or drilling within the Project limits; injury to or destruction of property at any time resulting therefrom.

The CONTRACTOR shall require similar insurance in such amounts to be taken out and maintained by each subcontractor.

**TOWN OF WESTERLY  
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2017-017  
DESIGN/BUILD ROOFTOP  
SOLAR SYSTEM  
HIGHWAY GARAGE**

Bids to be opened in the Council Chambers, 45 Broad St., Westerly, RI 02891 at **3:00 P.M. on April 27, 2017**

Vendor Name: \_\_\_\_\_

Vendor Mailing Address: \_\_\_\_\_

Town – State - Zip Code: \_\_\_\_\_

(Area Code) Telephone Number: \_\_\_\_\_

(Area Code) FAX Number: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Federal ID or Social Security Number: \_\_\_\_\_

Payment Terms: Net 30

Delivery in Days After Receipt of Purchase Order: \_\_\_\_\_

Initial appropriate line to acknowledge addendum(s), if necessary

Addendum #1\_\_\_\_\_Addendum #2\_\_\_\_\_Addendum #3 \_\_\_\_\_

Completed and Submitted Appendix A? Yes\_\_\_\_\_No \_\_\_\_\_

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Authorized Signature/Title (Typed or Printed)

## CONTRACTOR'S QUESTIONNAIRE

Company Name: \_\_\_\_\_

Principal Officer: \_\_\_\_\_

Company Address: \_\_\_\_\_

Years in business under present name: \_\_\_\_\_

Primary type of work your firm engages in: \_\_\_\_\_

Years' experience in your primary type of work: \_\_\_\_\_

List other types of work your firm engages in: \_\_\_\_\_

\_\_\_\_\_

Does your organization have current occupational license(s) and certificate(s) of competency entitling it to do the work contemplated in this bid? Yes \_\_\_\_\_ No \_\_\_\_\_

### **Include copies of licenses and certificates with bid proposal.**

Does your organization currently accept Visa (P-Cards) as a form of payment? Yes \_\_\_\_\_ No \_\_\_\_\_

Demonstrate your capacity to perform work of this magnitude by indicating four (4) projects within the past two (2) years that are equal to or greater in scope. Must include police/emergency response center projects and Rhode Island municipal projects.

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Fax: \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Fax: \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Fax: \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Fax: \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

Have you ever failed to complete any work awarded to you? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, where and why? \_\_\_\_\_

Has any officer or partner of your organization ever failed to complete a contract handled in his own name? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, state name of individual, name of owner, and reason thereof: \_\_\_\_\_

\_\_\_\_\_



What equipment do you own that is available for the proposed work? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What bank or banks have you arranged to do business with if the bid should it be awarded to you?  
\_\_\_\_\_

List the names, addresses and phone numbers of all sub-contractors which you may utilize to perform this contract. No change in sub-contractors, as listed, will be allowed without the written approval of the Town of Westerly.

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Are you bidding the items specified? Yes \_\_\_\_\_ No \_\_\_\_\_

If no, the bidder must also include a sample of the alternate manufacturer's product they intend to supply as the "or equal" in addition to complying with the Exceptions to Specifications requirements set forth in the "General Conditions and Instructions" section of this bid.

# BID FORM

## 1.1 WORK INCLUDED

- A. The Design/Build contractor shall act as the prime contractor and these prices shall include work being provided by design professionals and all trades to accomplish the listed scope of work.
- B. All prices indicated shall be valid for the duration of two (2) years from the time of bid to cover the contracting process and anticipated project duration.
- C. Amounts indicated shall be for work fully installed complete with all associated components, checkout and testing.
- D. The cost of work shall include all required permits and inspections for the work performed.

## 1.2 BASE AND ALTERNATE PRICING

- A. Provide pricing as follows:

Base Project Total Cost: \$ \_\_\_\_\_

Department of Public Works Rooftop Solar System (Design, Utility Interconnection, Construction, Commissioning, Measurement and Verification (M&V), Training, Web-based Monitoring, Year 1 O&M, etc.)

<b>DPW Rooftop Solar</b>	
Nameplate Solar PV System Size	
Solar Access (Percent of Available Sunshine)	
Year 1 Guaranteed Solar Production	
Electric Usage Offset (Percent of Bill Covered)	
Solar Module Make & Model	
Solar Inverter Make & Model	
Number of Inverters	
Number of Years for Workmanship Warranty	
System Designed for What RI Program	
Total Project Cost	
Renewable Energy Fund Incentives	
Other Incentives/Tax Credits	
Net Project Cost to Town	

Mandatory Alternate 1:

Mandatory Alternate that includes scope modifications to Meet Budgetary Price: The Town of Westerly has borrowed the following funds as identified in the “Net Project Cost to Town” line item. Provide a proposal that maximizes the solar production on the DPW roof within the “Net Project Cost to Town” budgetary constraints.

<b>DPW Rooftop Solar</b>	
Nameplate Solar PV System Size	
Solar Access (Percent of Available Sunshine)	
Year 1 Guaranteed Solar Production	
Electric Usage Offset (Percent of Bill Covered)	
Solar Module Make, Model & Quantities	
Solar Inverter Make, Model & Quantities	
Number of Years for Workmanship Warranty	
System Designed for What Rhode Island Program	
Total Project Cost	
Renewable Energy Fund Incentives	
Other Incentives/Tax Credits	
Net Project Cost to Town	\$148,230

Voluntary Alternate Add/Deduct Price: If feasible and recommended by the Bidder provide an Add or Deduct alternate(s) that increases value or reduces costs to the Owner. All other scope items to remain.

Add/Deduct Alternate 1 (To be added/subtracted from Base Bid):\_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

Add/Deduct Alternate 2 (To be added/subtracted from Base Bid):\_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

Service Contract Prices

Provide a one-year service contract during warranty period . \$ INCLUDE IN BASE

Provide a one year service contract beginning after the warranty ends. \$ \_\_\_\_\_

Provide a fixed annual escalation for service contracts after Year 2 % \_\_\_\_\_

Provide a performance and payment bond. \$ \_\_\_\_\_

# DEPARTMENT OF PUBLIC WORKS ROOFTOP SOLAR SYSTEM DESIGN/BUILD OVERVIEW

The Town of Westerly RI is soliciting design/build proposals for a utility grid interconnected PV solar system mounted on the Department of Public Works (DPW) building. The DPW building is located at 35 Hirsch Lane, Westerly, RI 02891. The DPW utility grid interconnected PV solar system is anticipated to be roof mounted on the front and side of the building.

## Objective

Contractor shall provide a total “turnkey” project including all necessary equipment, materials, design, manufacturing and installation services for the installation of a roof mounted utility-interactive photovoltaic system that shall produce a minimum of 78,602 kWh AC per year at the point of interconnection, approximately 66.7 kW DC capacity. Larger capacity systems that produce more than the minimum are an alternative and will be evaluated. The contractor should prepare system summary detailing each location, applicable equipment/size, predicted system energy production (kWh). In relations to any building mounted system, the contractor shall evaluate roof conditions and may propose alternative systems that may be integrated with the roof or require modifications to the roof. This project shall meet all codes and requirements of this Statement of Work that apply. **Note: A lighting retrofit has recently been completed and the final system sizing shall be verified with latest available utility invoices and the lighting retrofit scope and implementation timeframes.**

## Scope

The contractor shall perform all professional services as necessary to provide the Town of Westerly RI with a complete design package including the requirements outlined in this Statement of Work. The contractor shall install the project such that it is operational and compliant with all applicable standards, building codes, NGRID interconnection requirements, and Rhode Island requirements. The contractor shall include specifications, calculations and drawings in the design package, and turn it over to the Town of Westerly, after approval by the Town of Westerly RI of the final design package; the contractor shall provide all necessary construction to successfully complete the photovoltaic system installation. The awarded contractor shall apply for and manage the rebate funding from the Rhode Island Renewable Energy Fund and any renewable energy certificates (RECs) paperwork.

## Rooftop Solar

The contractor shall develop a design for a new photovoltaic system. Not all locations identified need to be utilized. It is the responsibility of the contractor to assess the building structural integrity, roof condition and shading limitations.

- Mounting system shall limit roof penetrations and be mechanically fastened to building structure. Mounting system design needs to meet applicable local building code requirements with respect to snow, wind, and earthquake factors. Solar system installation should not void the roof warranty.
- Conduit penetrations shall be minimized.
- System shall be fixed tilt with an orientation that maximizes annual savings and kWh production.
- All roof access points shall be securely locked at the end of each day.
- System layout shall meet local fire department, code and ordinance requirements for roof access.

### **Code Compliance**

Installation and equipment shall comply with applicable building, mechanical, fire, seismic, structural and electrical codes. Only products that are listed, tested, identified, or labeled by UL, FM, ETL, or another Nationally Recognized Testing Laboratory shall be used as components in the project. Non-listed products are only permitted for use as project components when a comparable useable listed component does not exist. Non-listed products proposed for use as components must be identified as such in all submittals.

The contractor shall use project components that are or are made of materials that are recyclable, contain recycled materials, and that are EPA or Energy Star rated if they are available on the market.

The publications listed below form a part of this document and are hereby incorporated by reference:

- National Electrical Code (NEC)
- UL 1703 Flat – Plate PV Modules and Panels
- UL 1741 – Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems
- FM Approved – Fire Protection Tests for Solar Component Products
- IEC 62446 Grid Connected Photovoltaic Systems- Minimum Requirements for System Documentation, Commissioning Tests, and Inspections

Other technical codes that shall apply include:

- ASME PTC 50 (solar PV performance)
- ANSI Z21.83 (solar PV performance and safety)
- NFPA 853 (solar PV systems near buildings)
- IEEE 1547 (interconnections)
- ASCE/ SEI-7 – American Society of Civil Engineers – “Minimum Design Loads for Buildings and Other Structures”.
- NRCA – National Roofing Contractors Association

### **Registration Seals**

Each final working drawing and each submitted specification and calculation document shall be signed by, bear the seal of, and show the state certificate number of the architect and/or engineer who prepared the document and / or is responsible for its preparation.

### **Contractor Responsibilities**

The final design package and documents shall include the following but are not all required in the proposal stage. Please reference the proposal requirement section for detailed bid submission requirements:

- Description of the solar system
- Construction documents and engineering calculations that are signed and sealed by a licensed architect or engineer
- Layout drawing of installation site providing location of all equipment
- Equipment details and specifications
- Schedule for equipment procurement and installation
- Description of how NGRID grid interconnection requirements will be met
- Description of controls, monitors, and instrumentation to be used for the solar system
- Equipment and installation manuals
- Safety plan
- Quality control plan

- Operations and Maintenance manuals for system operations and performance monitoring over the life of the contract
- Operation and Maintenance during first year and optional service plan after the first year
- Web-based monitoring for 20 years
- Close out report including the following information: system nameplate size, the overall installed cost of the system and estimated and guaranteed annual kilowatt hour (kWh) production.

### **Warranties**

The solar provider's standard system warranty coverage should cover modules, inverter, racking and workmanship.

- Modules: 25-Year Power Output & Workmanship Warranty
- Inverter: 10-Year Limited Warranty, Provide a price and/or plan for inverter replacement in year 11 and beyond
- Racking: 10-Year Limited Warranty priority
- Workmanship: 1 Year Limited Warranty

### **Performance Criteria**

The following performance criteria shall be met for all arrays:

- Power provided shall be 480V three phase compatible with the onsite electrical system.
- Proposal shall provide estimated energy delivery for each array, for each month of the year and total for the year at the delivered voltage (480V).
- All proposed/implemented PV array locations shall be shade free from 9AM until 3PM (solar time). Contractor shall provide documentation of shading calculations for exterior extents for each proposed array. These calculations may be modified for shading obstructions that will be removed and mitigated as part of the project. Suggested documentation would include sun path diagrams for exterior array locations or SunEye measurements.
- All PV hardware components shall be either stainless steel or aluminum. PV structural components shall be corrosion resistant (galvanized steel, stainless steel, composites, or aluminum).
- The project, including supports and power conductors, shall not interfere with roof drains, water drainage, expansion joints, air intakes, existing electrical and mechanical equipment, existing antennas, and planned areas for future installation of equipment shown on drawings.

### **System Monitoring**

Monitoring of system performance and providing public education and outreach are important elements of this RFP. The Town of Westerly, RI, will favor a proposal that includes a turnkey monitoring system that can be integrated into the Town of Westerly, RI, computer system for display on the Town of Westerly, RI, website. The system should display and analyze historical and live solar electricity generation data. Additionally, the regularly collected data should reflect, but not be limited, to the following:

- Average and accumulated output (kWh/kW and total kWh)
- Capacity factor
- Air quality emissions averted (and real world equivalents conversion)

**Operation and Maintenance of System**

The successful respondent will be required to provide operation and maintenance of the entire solar electric system for the first year and provide pricing for subsequent years for a cash purchase. Operations and maintenance services include:

- Performance monitoring, notification, and troubleshooting – must have personnel available to notify Town of Westerly, RI, of an outage or decrease in system production
- Corrective maintenance to mitigate any risk to the system or minimize down time
- System Performance Reports that compare actual production to predicted production
- Preventative maintenance and inspections to identify and fix problems before they occur, including infrared photography for hot spots, manufacturer recommended maintenance, hardware torque checks, and array cleanings

The successful respondent shall supply Town of Westerly, RI, two copies of all Component Product Data and Component Operation and Maintenance manuals prior to system start-up. The information shall be sufficient for Town of Westerly, RI to evaluate and ensure appropriate O&M is being completed over the life of the system. Examples of components include solar panels, conduit, inverter, net metering equipment, etc. Project as-builts that detail location of all above and underground utilities and components shall be submitted within 30 days of system start-up.



## **Inspections and Tests**

- General. The contractor shall perform inspections and tests throughout the construction process including: existing conditions/needs assessments, construction installation placement/qualification measurements and final inspections/tests performance certification. Periodic “quality” inspections shall also be conducted to support progress payments as identified in the contractor’s Quality Control Plan (QCP).
- Town of Westerly, RI, Witness. All inspections and tests, to verify documented contract assumptions, to establish work accomplishment, or to certify performance attainment shall be witnessed by Town of Westerly, RI, and/or construction management (CM) and coordinated through the QCP.
- Final Inspections and Tests. In order to ensure compliance with provisions of the NEC, an inspection by a licensed electrical inspector is mandatory after construction is complete. Unless otherwise identified, manufacturer recommendations shall be followed for all inspection and test procedures. The NEC inspection shall be conducted by an independent third party electrical inspector familiar with PV systems. Provide qualifications of the proposed third party inspector for review and approval prior to conducting the NEC inspections.
- Tests shall include a commissioning of the array. Commissioning tests shall conform to the requirements in the QCP. Commissioning shall be performed for the entire PV system. This data shall be used to confirm proper performance of the PV system.
- Documentation. Inspections/tests required in the QCP shall result in a written record of data/observations. The Contractor shall provide two (2) copies of documents containing all test reports/findings. Test results shall typically include: item/system tested, location, date of test, test parameters/measured data, state of construction completion, operating mode, contractor inspector/Town of Westerly, RI, witness, test equipment description and measurement technique.

## **Project Closeout**

- Preparation for Final Inspection and Tests. The following steps shall be taken to assure the project is in a condition to receive inspections and tests.
- Finalize record drawings and manuals, indicating all “as-built” conditions.
- Record Drawings. The contractor shall maintain on site the working record drawings of all changes/deviations from the original design. Notations on record drawings shall be made in erasable red pencil or other color to correspond to different changes or categories of work. Marked-up drawings shall always be maintained at the contractor’s on site construction office, available for Town of Westerly, RI and/or CM to review. Record drawings shall note related change order designations on impacted work. When shop drawings indicate significant variations over design drawings, shop drawings may be incorporated as part of record drawings. Review of record drawings may be required before monthly payments can be processed.
- As-Built Drawings and Specifications. The Contractor shall provide "as-built drawings" and documents based upon actual site installation. Should Town of Westerly, RI, determine that variations exist between finished construction and the as-built drawings, the contractor shall correct drawings to the satisfaction of The Town of Westerly, RI.
- The contractor shall submit six (6) hard copies and two (2) CDs containing the “as-built” drawings and specifications as CAD and PDF files.
- Warranties and Guarantees. Submit specific warranties and guarantees, final certifications and similar documents to Town of Westerly, RI, upon substantial completion and prior to final payment. Include copies with operations and maintenance manual. All warranties shall be signed by a principal of the contractor’s firm and sealed if a corporation.

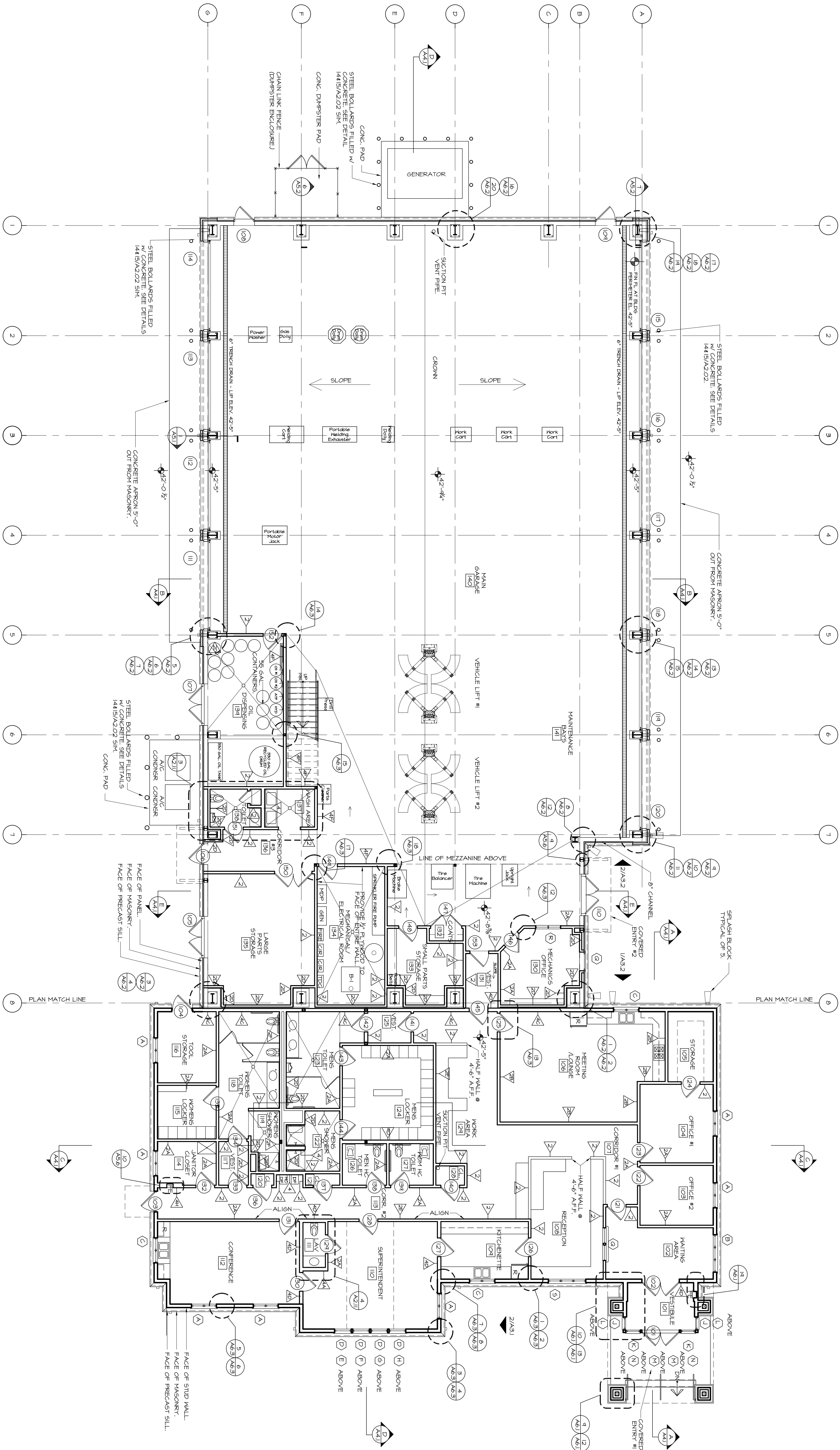
- **Maintenance Manual.** Provide a detailed operation and maintenance manual including diagram of system components, description of normal operation; description of operational indicators and normal status of each, table of modes of operation, safety considerations, preventative maintenance requirements, troubleshooting and corrective actions; sources of spare parts and cut-sheets for all components. The contractor shall prepare six (6) hardcopies and two (2) CDs containing the detailed Maintenance Manual. Submit to Town of Westerly, RI.
- **Spare Parts.** The contractor shall provide a recommended list of spare parts. At the minimum a set of combiner box fuses for each array shall be provided along with the required spare panels.
- **Demonstration and Training.** Provide Town of Westerly, RI approved training for designated personnel in the operation of the entire photovoltaic energy system, including operation and maintenance of inverter(s), transfer switches, panel board, disconnects and other features as requested by Town of Westerly, RI. Instruct the designated Town of Westerly, RI, personnel in removal and installation of panels, including wiring and all connections. Provide Town of Westerly, RI, with written instructions and procedures for shut-down and start-up activities for all components of the system. Town of Westerly, RI, shall be permitted to video tape this training for official use.

#### **Operations and Maintenance Service.**

- Provide operation and maintenance of the solar array systems for one year. Work shall include all manufacturer recommended maintenance as well as a 12 month performance commissioning. Town of Westerly, RI, shall be invited to witness all performance commissioning. A maintenance log shall be maintained to note dates, equipment and issues being resolved. Contractor should be available within 48 hours to respond to natural disasters (extreme storm, hail, wind events) to inspect array for damage.

#### **Attachments:**

Westerly DPW Garage As-Built Documents



## General Notes

1. Before starting each portion of the work, the contractor shall carefully study and compare the various drawings and other contract documents to facilitate the proper execution of the work. The contractor shall be responsible for the proper interpretation of the drawings and specifications. The contractor shall be responsible for the proper interpretation of the drawings and specifications.
2. General Contractor to provide required wall openings for the exhaust/inter-communicator, personnel lockers and evidence lockers. Contractor shall coordinate all size requirements with Owner.

NOTE:  
1) FOR BUSINESS AREA DIMENSIONAL  
PLAN SEE DRAWING A2.11  
2) FOR BUSINESS AREA DIMENSIONAL  
PLAN SEE DRAWING A2.12  
3) DOOR SWEPT CLEARANCE 12" ON 4"  
RUSH SIDE 18" ON FULL SIDE.

First Floor Plan

SCALE: 1/8" = 1'-0"

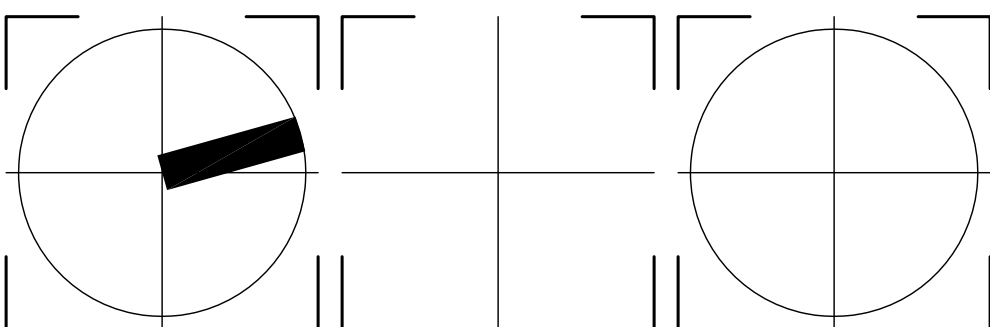
sheet revised project / title

no date by **Westerly DPW Highway Garage**

11/22/06  
**First Floor Plan**

**Larry Hirsch Way, Westerly RI 02891**

north engineer architect

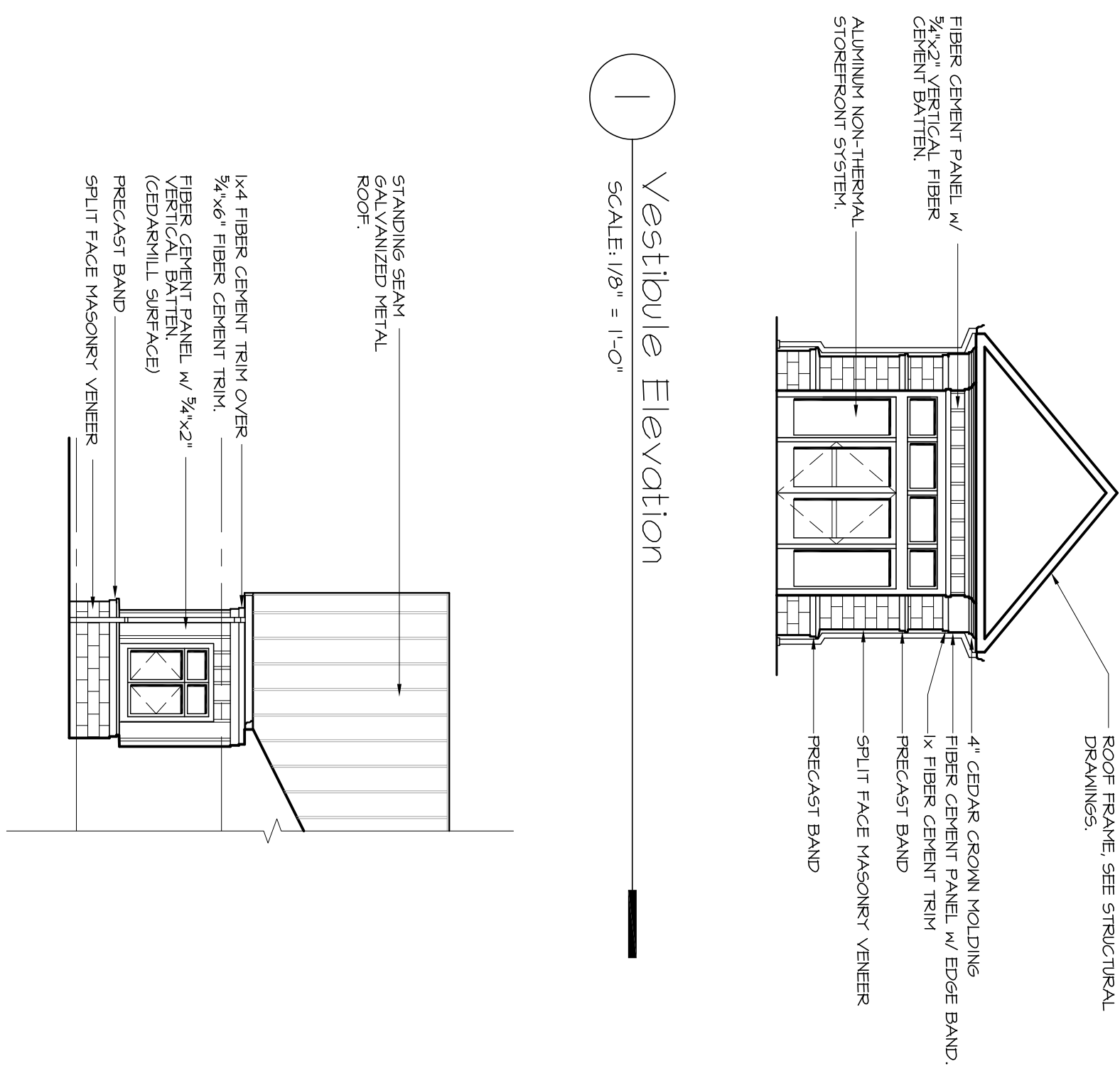


**AZZINARO • LARSON • ARCHITECTS**  
INCORPORATED

85 beach street  
(401)-596-6669, westerly, rhode island 02891

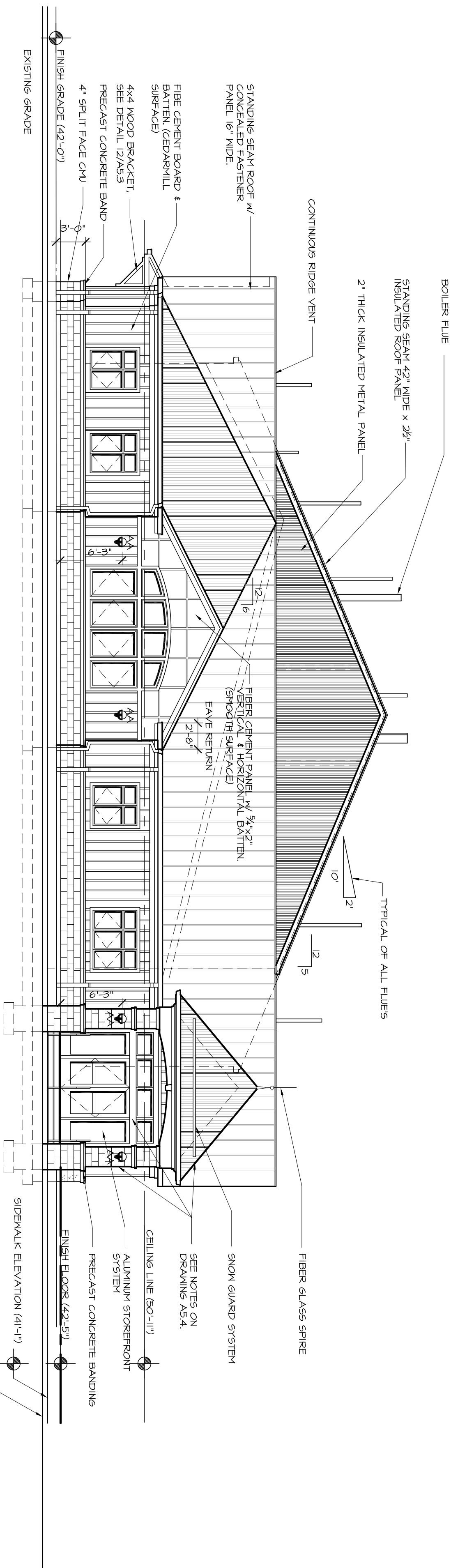




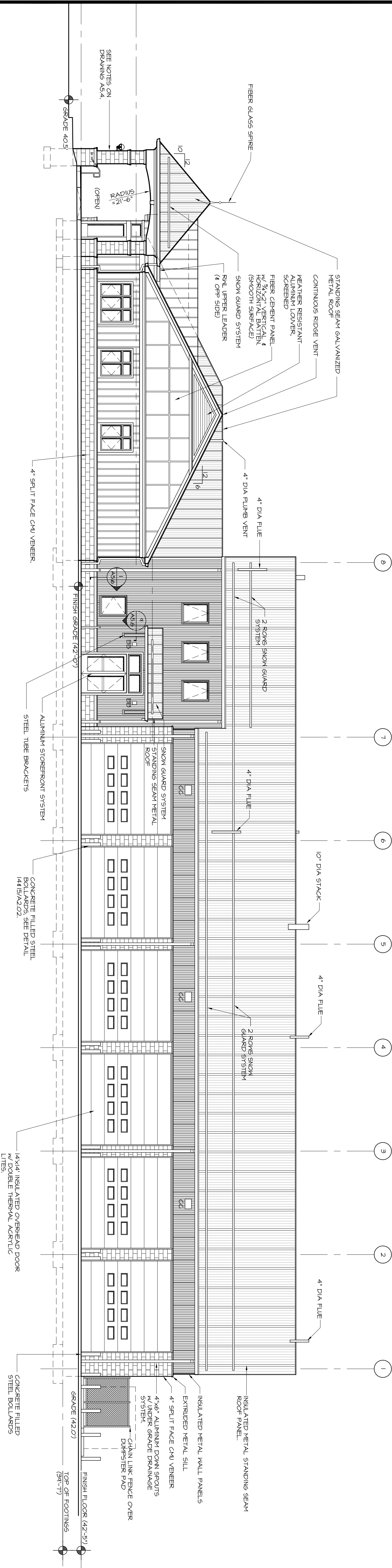


1 Vestibule Elevation  
SCALE: 1/8" = 1'-0"

2 Superintendent Hidden Elevation  
SCALE: 1/8" = 1'-0"



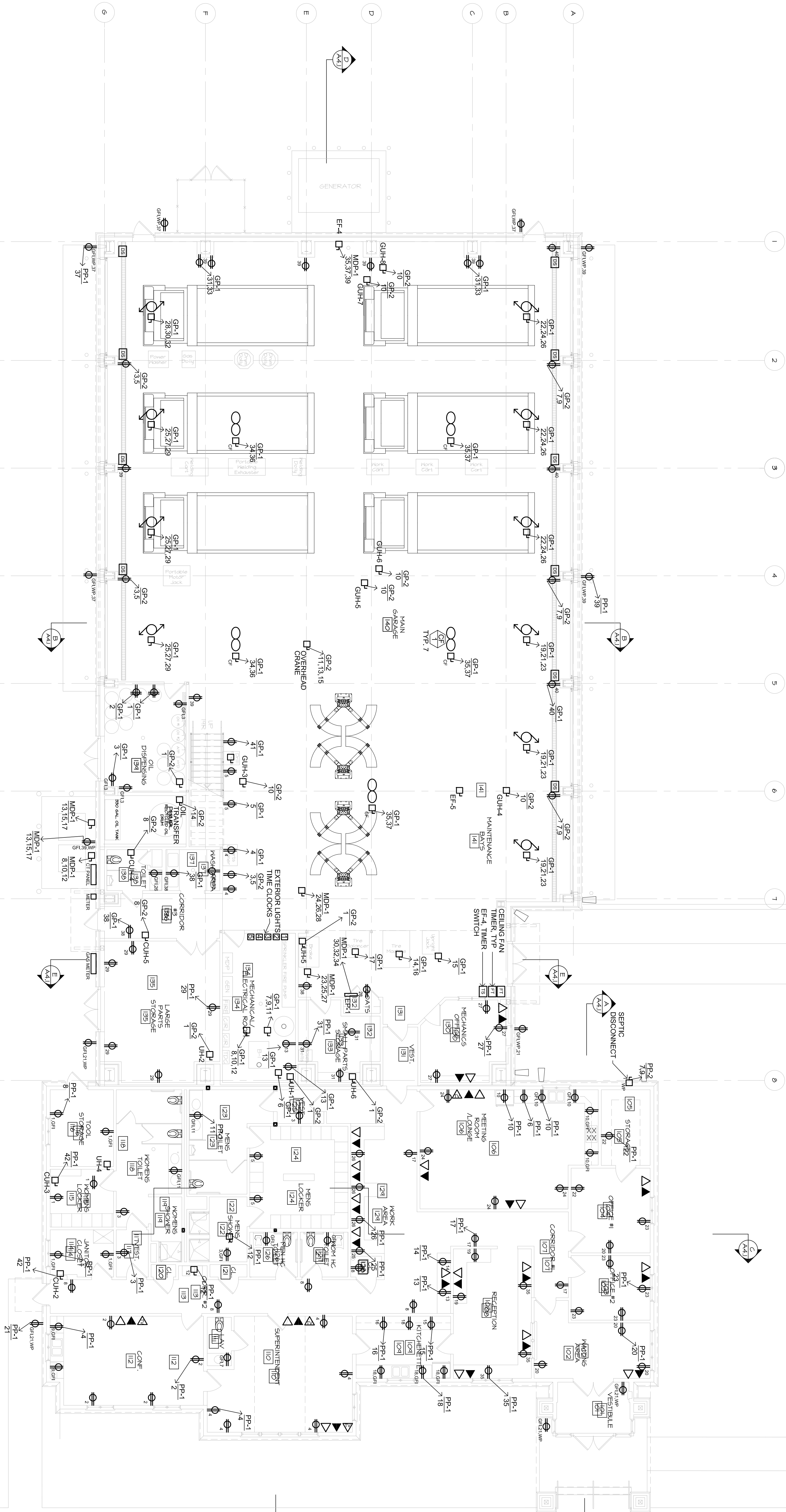
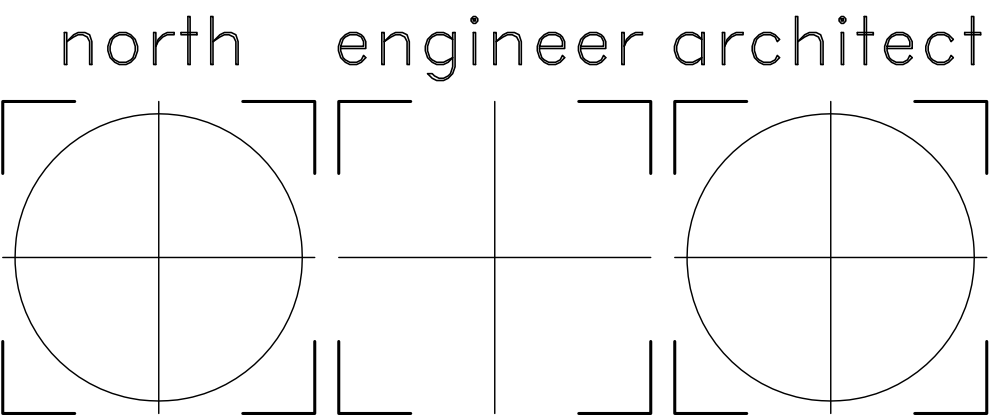
Front Elevation (East)  
SCALE: 1/8" = 1'-0"



Right Elevation (North)  
SCALE: 1/8" = 1'-0"





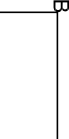





GENERAL ELECTRICAL NOTES

1. THE DRAWINGS SHOW A LAYOUT OF ELECTRICAL SYSTEMS AND EQUIPMENT IN APPROXIMATE LOCATIONS, BUT ARE SCHEMATIC ONLY. THE EXACT LOCATION OF EQUIPMENT AND THE ROUTING OF RACEWAYS SHALL BE DETERMINED BY THE STRUCTURAL CONDITIONS AND OTHER COMPLETE INFORMATION. THE DRAWINGS ARE NOT TO BE USED FOR THE PURCHASE OF MATERIALS, BUT ARE LIMITED TO SUPPORTS, CABLE LUGS, CONNECTORS, COVERS, FRAMES, OVER CURRENT PROTECTION, SIGNS, INSTRUCTIONS AND ALL INCIDENTAL DEVICES AND ACCESSORIES REQUIRED FOR A COMPLETE AND READY TO OPERATE SYSTEM. ALL SAFETY DEVICES SUCH AS SHUNT TRIPS, OVER-CURRENT DEVICE, TRANSFORMERS, SIGNS AND INSTRUCTIONS SHALL BE PART OF THIS CONTRACT.
2. WHERE THE DRAWINGS AND/OR SPECIFICATIONS CALL FOR EQUIPMENT TO BE LOCATED IN THE FIELD OR ON THE JOB, AND/OR THE CONTRACT DOCUMENTS DO NOT SHOW THE LOCATION OF EQUIPMENT SPECIFIED, IT SHALL BE UNDERSTOOD THAT THE EXACT LOCATION SHALL BE DETERMINED ON THE JOB BY THE ARCHITECT.
3. THE DRAWINGS SHOW THE LOCATION OF ELECTRICAL EQUIPMENT, LINE DISCONNECT SWITCHES, MOTOR STARTERS AND SIMILAR EQUIPMENT THROUGHOUT THE DRAWINGS ALONG WITH A LAYOUT OF ELECTRICAL ROOMS AND MECHANICAL ROOMS WITH ELECTRICAL EQUIPMENT. THESE LOCATIONS ARE SCHEMATIC ONLY. THE EXACT LOCATION OF THE ELECTRICAL EQUIPMENT SHALL BE DETERMINED ON THE JOB. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND FINAL LOCATIONS OF THE EQUIPMENT TO AVOID OBSTRUCTIONS AND TO MEET ALL SPACE REQUIREMENTS SET FORTH IN THE NATIONAL ELECTRICAL CODE.
4. WIRING FOR BRANCH CIRCUITS ABOVE HUNG CEILINGS (CONCEALED), IN THE WALLS AND PARTITIONS SHALL BE METAL-CLAD TYPE MC CABLE AS DEFINED BY THE NATIONAL ELECTRICAL CODE. EXPOSED WIRING OF THE TYPE EMT OR RIGID CONDUIT, METAL-CLAD CABLE SHALL NOT BE RUN IN EXPOSED LOCATIONS. ALL WIRING SHALL BE INSTALLED PER NEC ARTICLE 334-10. ALL CONDUITORS SHALL BE A MINIMUM SIZE OF NUMBER 12 AWG. ALL CONDUIT SIZES UNLESS SHOWN ON DRAWINGS SHALL ADHERE TO THE NEC CODE.
5. THE DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY. IF A PARTICULAR ITEM IS NOT SPECIFIED, THE CONTRACTOR SHALL REFERENCE THE CONTRACT DOCUMENTS, THE HIGHER GRADE SHALL BE CONSIDERED SPECIFIED.
6. WHEN DIMENSIONS ARE GIVEN ON THE DRAWINGS, THEY ARE APPROXIMATE ONLY. THESE DRAWINGS ARE GIVEN FOR THE CONVENIENCE OF THE BIDDERS. THE EXACT LENGTH MUST BE DETERMINED ON THE JOB BY THE BIDDER. NO EXTRA COMPENSATION WILL BE PROVIDED FOR ANY DISCREPANCIES BETWEEN THE ACTUAL MEASUREMENTS AND THOSE INDICATED ON THE DRAWINGS.
7. THE LOCATION OF LIGHTING FIXTURES SHOWN ON ELECTRICAL PLANS ARE APPROXIMATE. THE EXACT LOCATION SHALL BE SHOWN ON THE ARCHITECTURAL REFLECTED CEILING PLANS.
8. SHOP DRAWING REVIEW DOES NOT APPLY TO QUANTITIES NOR RELIEVE THIS CONTRACTOR OF HIS RESPONSIBILITY FOR FURNISHING MATERIALS OR PERFORMANCE. HIS WORK IN FULL COMPLIANCE WITH THESE CONTRACT DRAWINGS AND SPECIFICATIONS. REVIEW OF THESE SHOP DRAWINGS SHALL NOT BE CONSIDERED GUARANTEE OF THE MEASUREMENTS OF THIS BUILDING OR THE CONDITIONS ENCOUNTERED.
9. ALL ELECTRICAL BOXES SHALL HAVE COVERS. IF A BOX DOES NOT CONTAIN A DEVICE, A BLANK PLATE SHALL BE PROVIDED. NO BOX WITH OR WITHOUT WIRING AND OR A DEVICE SHALL BE LEFT WITHOUT A COVER.
10. DUPLEX RECEPTACLES ON LAY COUNTERS SHALL BE OF THE GROUND FAULT INTERRUPTING TYPE OR ON A GROUND FAULT INTERRUPTING TYPE CIRCUIT BREAKER. ALL KITCHEN RECEPTACLES SHALL BE GFI.
11. SUBMIT ALL EQUIPMENT AND MATERIAL TO ENGINEER FOR ACCEPTANCE. FAILURE TO SECURE ACCEPTANCE OF EQUIPMENT AND MATERIAL PRIOR TO INSTALLATION WILL NOT RELIEVE THIS CONTRACTOR FROM THE RESPONSIBILITY OF REMOVAL AND INSTALLATION OF SPECIFIED WORK AT THIS CONTRACTORS EXPENSE.
12. OBTAIN AND PAY FOR ALL STATE AND LOCAL PERMITS FOR ALL WORK BY THIS CONTRACTOR.
13. PROVIDE TO OWNER A ONE-YEAR FULL PARTS AND LABOR ON ALL EQUIPMENT AND MATERIAL A WARRANTY TO START AT CERTIFICATE OF OCCUPANCY.
14. SUBMIT TO OWNER TWO O & M MANUALS ON ALL INSTALLED EQUIPMENT BY THIS CONTRACTOR.
15. TV TO BE STANDARD COAXIAL CABLE WIRED BACK TO BASEMENT.
16. DATA AND TELEPHONE TO BE CAT5e WIRED BACK TO BASEMENT.
17. THIS CONTRACTOR IS REQUIRED TO VISIT THE SITE BEFORE SUBMITTING A BID TO OBSERVE EXISTING CONDITIONS. SHOULD ANY EXISTING CONDITION BE DIFFERENT FROM THAT WHICH IS SHOWN THIS MUST BE BROUGHT TO THE ENGINEERS ATTENTION BEFORE BID SUBMITTAL. THIS MUST BE DONE IN WRITING, NO VERBAL ACKNOWLEDGMENTS CAN BE ALLOWED. SHOULD THIS CONTRACTOR NOT BE ABLE TO PERFORM THEIR WORK AS SHOWN ON THE DRAWINGS BECAUSE OF AN EXISTING CONDITION NO EXTRA COMPENSATION WILL BE PROVIDED FOR THE PROJECT WORK.
18. ALL UNUSED EQUIPMENT, WIRE, MATERIAL, LIGHTS, SWITCHES, CONDUIT, MC CABLE ETC. TO BE REMOVED AND DISPOSED OF PROPERLY OFF SITE.
19. ALL REUSED WIRE CONDUIT, JUNCTION BOXES, BOXES, SWITCHES, MC CABLE MUST BE APPROVED IN WRITING BY THE ENGINEER PRIOR TO REUSE.


LEGEND




1. LIGHTING FIXTURE SEE ELECTRICAL SCHEDULE. INDICATES TYPE, SUBSCRIPT DESIGNATION, AND CIRCUIT WHEN INDICATED.




2. FUTURE SHADEN INDICATES EMERGENCY LIGHTING.




3. SINGLE POLE SWITCH D = DIMMER




4. 4-WAY SWITCH




5. DUPLEX RECEPTACLE MOUNTED 18" AFF 20 INDICATES CIRCUIT




6. SAME AS ABOVE BUT DOUBLE DUPLEX




7. RECEPTACLE MOUNTED AT 48" AFF




8. ADJACENT TO RECEPTACLE INDICATES GROUND FAULT PROTECTED




9. HEAT DETECTOR




10. HEAT DETECTOR IN CEILING PLENUM ATTIC




11. LIGHTING CONTROL PANEL




12. HEAT DETECTOR (FIXED TEMP.) 180°




13. FIRE ALARM ISOLATION MODULE




14. HEAT DETECTOR (FIXED TEMP. + RATE OF RISE)




15. HEAT DETECTOR IN MEZZANINE MECHANICAL ROOM (FIXED TEMP. + RATE OF RISE)




16. SECURITY PANEL




17. JUNCTION BOX




18. DIRECT DIGITAL CONTROL PANEL




19. DOOR SWITCH




20. DISCONNECT W/P INDICATES WEATHER PROOF EMB. 38 MINIMUM




21. TRANSFORMER SIZE AS INDICATED ELECTRICAL PANEL BOARD




22. FIRE ALARM HORN/STROBE UNIT




23. FIRE ALARM HORN ONLY




24. REMOTE INDICATOR WITH TEST AND RESET




25. SMOKE DETECTOR, FIRELITE MODEL, SD 350(A)




26. SMOKE DETECTOR LOCAL ALARM ONLY




27. CARBON MONOXIDE DETECTOR LOCAL ALARM ONLY




28. FIRE ALARM MANUAL PULL STATION




29. TELEPHONE OUTLET (2)




30. DATA OUTLET (4)




31. EMERGENCY BATTERY UNIT 8 VOLTS EMERGENCY EQM72 29 (2D)




32. EXIT LIGHT WALL MOUNTED EMERGENCY MODEL EQ LXMR (MOUNT AT TOP 8'-0" AFF)




33. EXIT LIGHT CEILING MOUNTED EMERGENCY MODEL EQ LXMR (FEDERAL)




34. REMOTE EMERGENCY LIGHTS EMERGENCY MODEL ET23




35. WATER FLOW DETECTOR




36. TAMPER SWITCH




37. LOWELL CEILING SPEAKER MODEL 653W-772 W/ 50 DB SPL @ 1000 HZ AND 125 DB @ 1000 HZ




38. HOME RUN




39. CIRCUIT BREAKER DESIGNATION




40. SURFACE MOUNTED KNOB BOX




41. FIRE ALARM PANEL, EMERGENCY




42. FIRE ALARM MASTER BOX #2685




43. CONDUIT SIZE



44. ELECTRIC GROUND



45. # OF CONDUITS

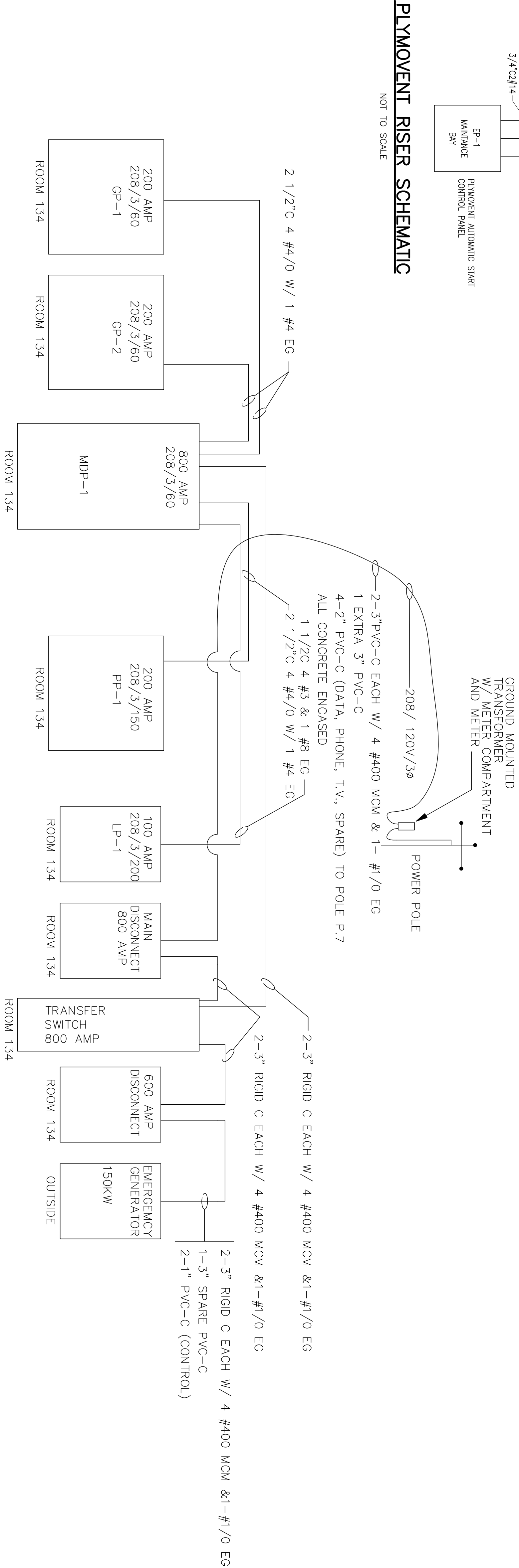
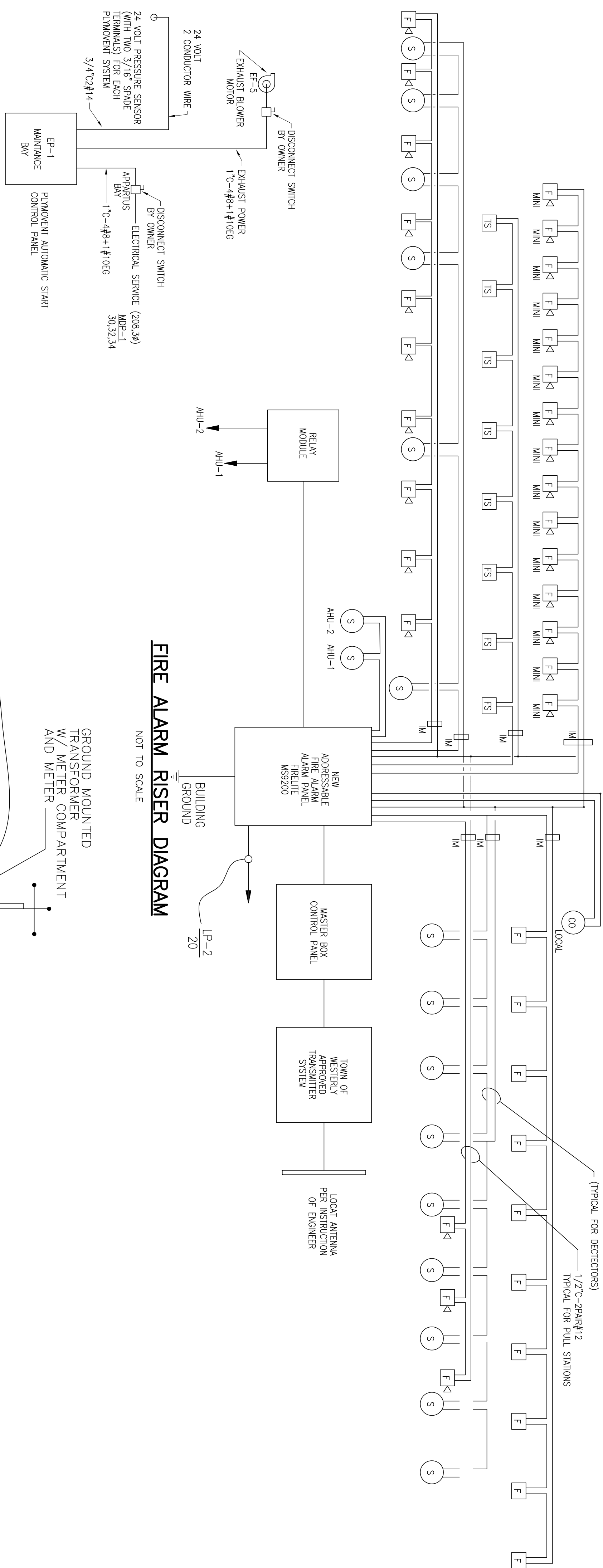


LIGHTING FIXTURES SCHEDULE

TYPE	MANUFACTURER & CATALOG NUMBER	LAMPS		NOTES
		QTY	WATTS	
A	Cooper Metalex 2PXC2225 291120EB81	2	32	FLUORESCENT
B	Cooper Metalex 2PXC2U618S 331120EB18	2	31	U618
C	Cooper Metalex 331120EB18	2	31	U618
D	Cooper Portland C 7042-E-7080	1	42	CF
E	Cooper Portland C 7042-E-7080-46	1	42	CF
F	Cooper Metalex 20C8FA2 U618120EB81	2	31	U618
G	Cooper Halo H 271/171PS	1	32	CF
H	Cooper Halo H 271/171PS	1	32	CF
K	Undercounter Lightolier TCU20W120S0	2	20T518	Undercounter 18" Length
J	Cooper Indium part IPSP3151D120AC27ES	6	54	T5H0 W / DIMMER 8 ARC-ARC CABLE
L	Cooper F-84Y BR15-2-54T5-FL 120 EB81	1	100	FLUORESCENT 96" LONG
M	Cooper F-84Y BR15-2-54T5-FL 120 EB81	1	100	FLUORESCENT 1 BALLAST
N	Cooper Metalex Strip 615W 2 5415 120 EB81	2	54	FLUORESCENT SURFACE WRAP AROUND
P	Cooper LUMARK PRAGMATIC HIGH-BAY WHSS-7022W-400-208	1	400	MH
Q	Cooper LUMARK PRAGMATIC HIGH-BAY WHSS-7022W-400-208	1	400	MH
R	Cooper LUMARK PRAGMATIC HIGH-BAY WHSS-7018W-250-208	1	250	MH
AA	Kichler 9691 textured black white glass	1	100	UL Listed for wet location. Time Clock Circuit #4
BB	COOPER: FALSAFE TT BOVE 32W A 120	1	32	CF
CC	COOPER MPACT MH117	1	175	MH
DD	Cooper McGraw-E Edison PATHWAY LUMINAIRE Bro-36-50-WH-208-BK	1	50	MH
EE	"EL" #1--8524-2 fixture	1	175	MH
FF	Cooper Lumark Outdoor #MH HR R3 400 WTR	1	400	MH
GG	Cooper Lumark Outdoor #MH HR R3 400 WTR	2	400	MH
HH	Focus Industries #FTL9 mini flood light	9		Compact Flood Ground Finish Bronze Time Clock Circuit #5

PANELBOARD SCHEDULE									
PANEL #		LOCATION: 134		INDOOR					
SERVICE	208/200V-1	3 PHASE	4 WIRE	100 AMP 3 POLE/4 WIRE	200 AMP 3 POLE/4 WIRE	300 AMP 3 POLE/4 WIRE	400 AMP 3 POLE/4 WIRE	500 AMP 3 POLE/4 WIRE	600 AMP 3 POLE/4 WIRE
OK FOR	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS	TRIP POSITIONS
1	100	20	1	120	2	100	20	1	120
2	100	20	1	120	2	100	20	1	120
3	100	20	1	120	2	100	20	1	120
4	100	20	1	120	2	100	20	1	120
5	100	20	1	120	2	100	20	1	120
6	100	20	1	120	2	100	20	1	120
7	100	20	1	120	2	100	20	1	120
8	100	20	1	120	2	100	20	1	120
9	100	20	1	120	2	100	20	1	120
10	100	20	1	120	2	100	20	1	120
11	100	20	1	120	2	100	20	1	120
12	100	20	1	120	2	100	20	1	120
13	100	20	1	120	2	100	20	1	120
14	100	20	1	120	2	100	20	1	120
15	100	20	1	120	2	100	20	1	120
16	100	20	1	120	2	100	20	1	120
17	100	20	1	120	2	100	20	1	120
18	100	20	1	120	2	100	20	1	120
19	100	20	1	120	2	100	20	1	120
20	100	20	1	120	2	100	20	1	120
21	100	20	1	120	2	100	20	1	120
22	100	20	1	120	2	100	20	1	120
23	100	20	1	120	2	100	20	1	120
24	100	20	1	120	2	100	20	1	120
25	100	20	1	120	2	100	20	1	120
26	100	20	1	120	2	100	20	1	120
27	100	20	1	120	2	100	20	1	120
28	100	20	1	120	2	100	20	1	120
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31	100	20	1	120	2	100	20	1	120
32	100	20	1	120	2	100	20	1	120
33	100	20	1	120	2	100	20	1	120
34	100	20	1	120	2	100	20	1	120
35	100	20	1	120	2	100	20	1	120
36	100	20	1	120	2	100	20	1	120
37	100	20	1	120	2	100	20	1	120
38	100	20	1	120	2	100	20	1	120
39	100	20	1	120	2	100	20	1	120
40	100	20	1	120	2	100	20	1	120
41	100	20	1	120	2	100	20	1	120
42	100	20	1	120	2	100	20	1	120
43	100	20	1	120	2	100	20	1	120
44	100	20	1	120	2	100	20	1	120
45	100	20	1	120	2	100	20	1	120
46	100	20	1	120	2	100	20	1	120
47	100	20	1	120	2	100	20	1	120
48	100	20	1	120	2	100	20	1	120
49	100	20	1	120	2	100	20	1	120
50	100	20	1	120	2	100	20	1	120
51	100	20	1	120	2	100	20	1	120
52	100	20	1	120	2	100	20	1	120
53	100	20	1	120	2	100	20	1	120
54	100	20	1	120	2	100	20	1	120
55	100	20	1	120	2	100	20	1	120
56	100	20	1	120	2	100	20	1	120
57	100	20	1	120	2	100	20	1	120
58	100	20	1	120	2	100	20	1	120
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68	100	20	1	120	2	100	20	1	120
69	100	20	1	120	2	100	20	1	120
70	100	20	1	120	2	100	20	1	120
71	100	20	1	120	2	100	20	1	120
72	100	20	1	120	2	100	20	1	120
73	100	20	1	120	2	100	20	1	120
74	100	20	1	120	2	100	20	1	120
75	100	20	1	120	2	100	20	1	120
76	100	20	1	120	2	100	20	1	120
77	100	20	1	120	2	100	20	1	120
78	100	20	1	120	2	100	20	1	120
79	100	20	1	120	2	100	20	1	120
80	100	20	1	120	2	100	20	1	120
81	100	20	1	120	2	100	20	1	120
82	100	20	1	120	2	100	20	1	120
83	100	20	1	120	2	100	20	1	120
84	100	20	1	120	2	100	20	1	120
85	100	20	1	120	2	100	20	1	120
86	100	20	1	120	2	100	20	1	120
87	100	20	1	120	2	100	20	1	120
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96	100	20	1	120	2	100	20	1	120
97	100	20	1	120	2	100	20	1	120
98	100	20	1	120	2	100	20	1	120
99	100	20	1	120	2	100	20	1	120
100	100	20	1	120	2	100	20	1	120





## PLYMOVENT RISER SCHEMATIC

NOT TO SCALE

# FIRE ALARM RISER DIAGRAM

NOT TO SCALE

## ELECTRIC RISER DIAGRAM

NOT TO SCALE

**G.W. PREISS & SON**  
**MECHANICAL ELECTRICAL PLUMBING**

## MECHANICAL, ELECTRICAL, PLUMBING



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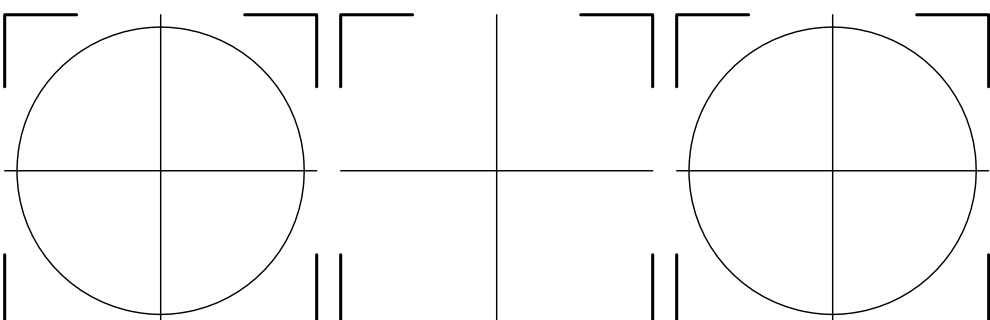
sheet      revised      project / title

## Westerly DPW Highway Garage

## Notes & Details

**Larry Hirsch Way, Westerly RI 02891**

north engineer architect



**AZZINARO · LARSON · ARCHITECTS**  
INCORPORATED

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